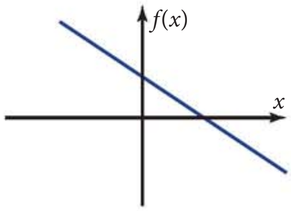

Figure 1-2e

- **Linear function,** *Figure 1-2e* (another special case of a polynomial function)

  General equation: $f(x) = ax + b$ (or $f(x) = mx + b$)

  Verbally: $f(x)$ varies linearly with x, or $f(x)$ is a linear function of x.

  Features: The straight-line graph, $f(x)$, changes at a constant rate as x changes. The domain is all real numbers.

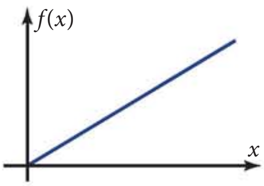

Figure 1-2f

- **Direct variation function,** *Figure 1-2f* (a special case of a linear, power, or polynomial function)

  General equation: $f(x) = ax$ (or $f(x) = mx + 0$, or $f(x) = ax^1$)

  Verbally: $f(x)$ varies directly with x, or $f(x)$ is directly proportional to x.

  Features: The straight-line graph goes through the origin. The domain is all real numbers. However, for most real-world applications, you will use the domain $x \geq 0$ (as shown).

- **Power function,** *Figure 1-2g* (a polynomial function if b is a nonnegative integer)

  General equation: $f(x) = ax^b$ (a *variable* with a *constant* exponent), $a \neq 0$, $b \neq 0$

  Verbally: $f(x)$ varies directly with the bth power of x, or $f(x)$ is directly proportional to the bth power of x.

  Features: The domain depends on the value of b. For positive integer values of b, the domain is all real numbers; for negative integer values of b, the domain is $x \neq 0$. In most real-world applications, the domain is $x \geq 0$ if $b > 0$ and $x > 0$ if $b < 0$.

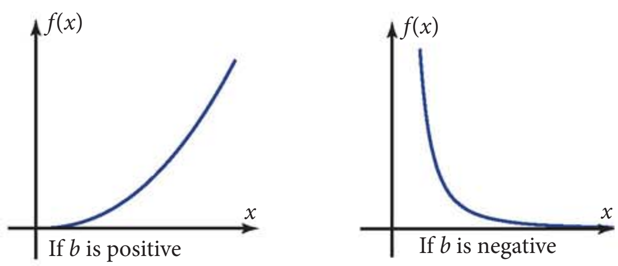

Figure 1-2g

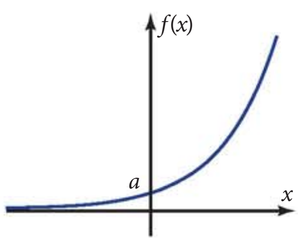

Figure 1-2h

- **Exponential function,** *Figure 1-2h*

  General equation: $f(x) = a \cdot b^x$ (a *constant* with a *variable* exponent), $a \neq 0$, $b > 0$, $b \neq 1$

  Verbally: $f(x)$ varies exponentially with x, or $f(x)$ is an exponential function of x.

  Features: The graph crosses the y-axis at $f(0) = a$ and has the x-axis as an asymptote.

How about if $0 < b < 1$?
For example, $y = \left(\frac{1}{2}\right)^x$